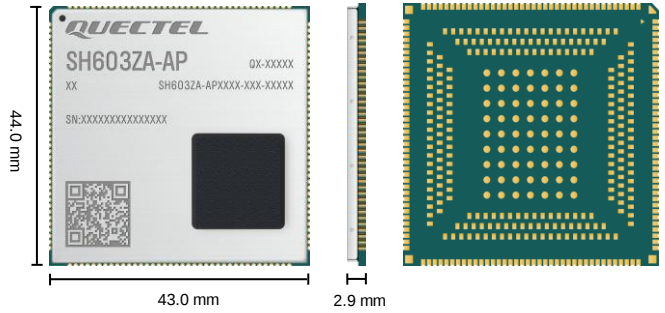


Quectel SH603ZA-AP

Smart Module



SH603ZA-AP is Quectel's new generation of smart module, which integrates Rockchip IoT chip RK3576/ RK3576J, including high-performance 4 × ARM Cortex-A72 + 4 × ARM Cortex-A53 CPU, ARM Mali G52 MC3 GPU, 16 M ISP HDR and 6 TOPS NPU computing power. Supporting external Wi-Fi and Bluetooth, the module is ideal for industrial applications requiring automation , as well as consumer applications requiring high computing power and multimedia functions.

SH603ZA-AP module integrates abundant peripheral interfaces: 1 × HDMI/ DP/ eDP/ MIPI, dual 1000 Mbps ethernet interfaces, multiple industrial serial interfaces, 2 × USBs, 2 × PCies, 2 × CANs, 2 × SATAs, 12 × UARTs etc. Supporting 8K @ 30 fps or 4K @ 120 fps decoding (H.265/ VP9/ AV1, etc.) and 4K @ 60 fps encoding (H.264/ H.265), as well as triple-screen displays, the module can satisfy the requirements of domestically applying edge devices in industrial edge computing by means of its 6 TOPS NPU and complete in-depth learning algorithms. The module, with built-in Linux/ Android/ Ubuntu/ Debian operating system, can also be used with external Quectel Cat 4/ 1, 4G, Voice, Wi-Fi 6 and GNSS modules, which greatly expands its applicability to the scenarios in M2M industry, such as smart commercial displays, robots, live videos, smart retails, industrial control, E-books, industry tablets, etc.



Key Features

- ✓ 4 × ARM Cortex-A72 + 4 × ARM Cortex-A53 CPU
- ✓ ARM Mali G52 MC3 GPU
- ✓ 16 M ISP HDR
- ✓ 6 TOPS NPU computing power
- ✓ 8K @ 30 fps or 4K @ 120 fps or 4K @ 60 fps video decoding
- ✓ 4K @ 60 fps video encoding
- ✓ PCIe 2.1/ USB 3.2/ SD 3.0
- ✓ HDMI 2.1/ MIPI DSI-2 1.1/ eDP 1.3
- ✓ MIPI CSI 1.2/ 2.0
- ✓ Dual 1000 M ethernet interfaces



4 × ARM Cortex-A72
+ 4 × ARM
Cortex-A53 CPU



ARM
Mali G52 MC3 GPU



Linux/ Android/
Ubuntu/ Debian



PCI Express



Multimedia
Processing Engine



Dual 1000 M
Ethernets

Module	SH603ZA-AP	
Category	Commercial-grade	Industrial-grade*
Platform	RK3576	RK3576J*
CPU	4 × A72 @ 2.2 GHz + 4 × A53 @ 2.0 GHz	4 × A72 @ 1.6 GHz + 4 × A53 @ 1.4 GHz
GPU	G52MC3 (900M)	G52MC3 (700M)
Memory	2 GB LPDDR4x + 64 GB eMMC (Optional) 4 GB LPDDR5x + 64 GB eMMC (Default) 8 GB LPDDR5x + 128 GB eMMC (Optional) 8 GB LPDDR5x + 256 GB eMMC (Optional)	2 GB LPDDR4x + 64 GB eMMC (Default) 4 GB LPDDR4x + 64 GB eMMC (Optional)
Temperature Range		
Operating Temperature	-25 °C ~ +75 °C	-35 °C ~ +75 °C
Electrical Features		
Power Consumption	Approx.2.68 mA	TBD
Certifications		
Regulatory/ conformance	CE/ RCM	CE*/ RCM*
Module	General Features	
Region/ Operator	Global	
NPU	6 TOPS	
OS	Linux (Kernel 6.1)/ Android 14/ Android 16*/ Ubuntu 22.04*/ Debian 11*	
Dimensions (mm)	44.0 × 43.0 × 2.9	
Package	LCC + LGA	
Weight (g)	Approx. 11.5 g	
Interfaces		
Display	1 × 4-lane MIPI DSI-2 v1.1: up to 2560 × 1600 @ 60 Hz 1 × eDP (multiplexed with HDMI): up to 4096 × 2160 @ 60 Hz 1 × HDMI (can be multiplexed as eDP): up to 4096 × 2160 @ 120 Hz 1 × LCDC* (multiplexed from other signal pins): 1 × RGB888*: 24-bit RGB888 output, up to 1920 × 1080 @ 60 Hz 1 × BT.1120*: 16-bit BT.1120 output, up to 1920 × 1080 @ 60 Hz 1 × BT.656*: 8-bit BT.656 output, up to 720 × 576 @ 60 Hz; PAL and NTSC 1 × EBC* (multiplexed from other LCDC signal pins): up to 2560 × 1920 @ 85 Hz hardware decoding 1 × USB/ DP: up to 4096 × 2160 @ 120 Hz	
Camera	2 × 4-lane MIPI CSI D-PHY v1.2 with up to 2.5 Gbps/lane, which can be divided into 2 × 2-lane + 2 × 2-lane 1 × 4-lane MIPI CSI D-PHY v2.0, up to 2.5 Gbps/lane - Up to five cameras - Up to 3 concurrent cameras - Up to 16 MP pixels for a single camera	
Audio	Digital audio	
Video	Encoding: H.264/ H.265 standard, up to 4K @ 60 fps Decoding: - H.264/ AVC Main Profile @ L5.2, up to 4K @ 60 fps - H.265/ HEVC Main Profile @ L6.0, up to 8K @ 30 fps or 4K @ 120 fps - VP9 Profile 0/ 2 @ L6.0, up to 8K @ 30 fps or 4K @ 120 fps - AVS2 Profile 0/ 2 @ L8.2.120, up to 8K @ 30 fps or 4K @ 120 fps - AV1 Main Profile @ L6.0, up to 8K @ 30 fps or 4K @ 120 fps - H.264 MVC, up to 4K @ 60 fps	
USB	× 2, compliant with USB 3.2/ 2.0 specifications; USB OTG	
PCIe	× 2, compliant with PCIe 2.1 specification; RC mode only	
RGMII	Max. × 2	
UART	Max. × 12 ②	
SATA*	Max. × 2 ②, compliant with SATA 3.1 specification	
SDIO	Max. × 2 (only one SD card, SD 3.0, 4 bits; supporting system boot function ①)	
I2C	Max. × 10 ②	
SAI	Max. × 5 ②	
I2S	Max. × 5	
ADC	× 4, general-purpose ADC interface	
SPI	Max. × 5, master and slave modes	
PWM	Max. × 16 ②	
CAN	Max. × 2 ②, up to 5 Mbps data rate; CAN FD	
Keypad	PWRKEY/ RESET_N/ VOL_UP/ BOOT/ VOL_DOWN	
GPIO	Max. × 130 ②	
Electrical Features		
Supply Voltage Range	3.55–5.5 V, typ. 5 V	

Notes:
*: Under development/ in progress.
TBD: To be determined.
①: This function is used for firmware upgrades via SD card.
②: Multiplexing interfaces included.

